

2007 Project Abstract

For the Period Ending June 30, 2009

PROJECT TITLE: COUNTY GEOLOGIC ATLAS PROGRAM ACCELERATION

PROJECT MANAGER: Dale R. Setterholm

AFFILIATION: Minnesota Geological Survey, University Of Minnesota

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FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: ML 2007, Chap. 30, Sec. 2, Subd. 5(j).

APPROPRIATION AMOUNT: \$400,000

Overall Project Outcome and Results

The County Geologic Atlas program creates geologic maps and associated databases at scales appropriate for resource management, especially ground water management, at the local scale. This grant funded progress on such mapping for Benton and Chisago counties. The counties qualified for participation by establishing accurate digital locations for water wells with construction records that are used as a basic data element in creating the maps. For each county the following products have been constructed:

- Database of well record information with geologic interpretations and a location map;
- Map of the glacial materials occurring at the land surface;
- Map of the bedrock types occurring at the surface of the bedrock;
- Closely-spaced cross-sectional views of the distribution of glacial materials between the land surface and the bedrock surface;
- Map of the elevation of the bedrock surface;
- Map of the thickness of glacial materials above the bedrock surface.

Tasks remaining include:

- Map or maps of the distribution of aquifers within the glacial materials;
- Digital surfaces for multiple sedimentary bedrock formations;
- CD or DVD with digital files of all the maps and databases and a GIS project to display and manipulate those maps and data;
- Printed copies of all the maps. These unfinished products will be created under our 2008 LCCMR grant.

The final outcome of completed county geologic atlases is an understanding of the distribution of aquifers and wells including how the aquifers are connected with each other, how they are connected to the land surface, and how they are connected to surface water features. Hydrologic maps and databases will be created by DNR Waters. The LCCMR funds were augmented with a matching grant of \$41,110 from the United States Geological Survey under the STATEMAP program.

Project Results Use and Dissemination

When the additional products for Benton and Chisago counties are complete (expected December 2009 using M.L. 2008 appropriation from the Environment and Natural Resources Trust Fund) a workshop will be arranged to present this work to local users, and to explain how it was created and how it might be applied to resource management. The MGS provides ongoing support of these products as well. Logical applications that have arisen already include the search for municipal well sites for the City of Foley, evaluation of the effects of quarrying on local ground water in Benton County, and an evaluation of the ground water implications of a proposed power plant in Chisago County. Draft versions of some products have already been distributed to parties involved in these issues. The digital versions of the products will

be available on CD or DVD and from the website of the Minnesota Geological Survey, and 1,000 printed copies will be distributed to each county. The County Geologic Atlases are a well-known and well-used source of data and geologic interpretations for state and local agencies, consultants, well construction contractors, and citizens. Many of the elements of the atlases are specifically named in the data needs identified in sustainable ground water management plans under development in Minnesota. They are provided in formats appropriate for the complete spectrum of users, including those who don't use computers through users that require digital files appropriate for modeling and simulation of the ground water system.

Trust Fund 2007 Work Program Final Report

Date of Report: August 15, 2009
Trust Fund 2007 Work Program Final Report
Date of Work program Approval: June 5, 2007
Project Completion Date: June 30, 2009

I. PROJECT TITLE: County Geologic Atlas Program Acceleration

Project Manager: Dale R. Setterholm
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Web Page address: <http://www.geo.umn.edu/mgs>

Location: Benton and Chisago counties

Total Trust Fund Project Budget:	Trust Fund Appropriation:	\$ 400,000
	Minus Amount Spent:	\$ 400,000
	Equal Balance:	\$ 0

Legal Citation: ML 2007, Chap. 30, Sec. 2, Subd. 5(j).

Appropriation Language:

\$400,000 is from the trust fund to the University of Minnesota, Minnesota Geological Survey to accelerate the production of county geologic atlases which describe location, size, boundaries and vulnerability of aquifers to enhance the protection and use of ground water.

II. and III. FINAL PROJECT SUMMARY

The County Geologic Atlas program creates geologic maps and associated databases at scales appropriate for resource management, especially ground water management, at the local scale. This grant funded progress on such mapping for Benton and Chisago counties. The counties qualified for participation by establishing accurate digital locations for water wells with construction records that are used as a basic data element in creating the maps. For each county the following products have been constructed:

- Database of well record information with geologic interpretations and a location map;
- Map of the glacial materials occurring at the land surface;
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Tasks remaining include:

- Map or maps of the distribution of aquifers within the glacial materials;
- Digital surfaces for multiple sedimentary bedrock formations;
- CD or DVD with digital files of all the maps and databases and a GIS project to display and manipulate those maps and data;
- Printed copies of all the maps. These unfinished products will be created under our 2008 LCCMR grant.

The final outcome of completed county geologic atlases is an understanding of the distribution of aquifers and wells including how the aquifers are connected with each other, how they are connected to the land surface, and how they are connected to surface water features. Hydrologic maps and databases will be created by DNR Waters. The LCCMR funds were augmented with a matching grant of \$41,110 from the United States Geological Survey under the STATEMAP program.

IV. OUTLINE OF PROJECT RESULTS:

Result 1 Geologic Mapping and Databases, Benton County Budget: \$199,786

- Produce geologic maps and associated databases for Benton County.
- A completed atlas will include maps of bedrock geology, surficial geology, database, bedrock topography, depth-to-bedrock, and subsurface Quaternary geology in GIS formats. This project will not complete all of those products (see deliverables).
- Benton County will contribute effort, and possibly funding to this project.

Summary Budget Information for Result 1: Trust Fund Budget: \$199,786
Amount Spent: \$199,786
Balance: \$ 0

Deliverable	Completion Date	Budget	Status
1. County Well Index database	6/30/08	\$48,696.50	complete
2. Revised surficial geology map	6/30/08	\$50,196.50	complete
3. Bedrock topography / drift thickness	6/30/08	\$ 3,500.00	complete
4. Bedrock geology map	6/30/09	\$53,696.50	draft
5. Progress on subsurface geology	6/30/09	\$43,696.50	underway

Final Report Summary:

Approximately 75% of the products typically included in a county geologic atlas have been completed for Benton County. This is a positive outcome considering a typical atlas costs about \$330,000 and this work has been completed for less than \$200,000. Completing the atlas with the funds allocated to that purpose in the 2008 grant will be a challenge, but I am hopeful we will achieve that. It would be helpful to identify candidate counties in advance of the grant period, and have them qualify for the program by establishing well locations before the grant starts. However, until the grant is in place I cannot promise to do the work, and they will not likely participate without that promise. Conducting their work within the grant period somewhat delays MGS work, and compresses the project schedule. The award of less than full funding for an atlas is also a challenge. The products are all essential, and the project scope cannot realistically be changed. Less than full funding requires finishing the project on a subsequent grant, or with alternative funding, and it is not easily coordinated.

Result 2 Geologic Mapping and Databases, Chisago County Budget: \$200,214

- Produce geologic maps and associated databases for Chisago County.
- A completed atlas will include maps of bedrock geology, surficial geology, database, bedrock topography, depth-to-bedrock, and subsurface Quaternary geology in GIS formats. This project will not complete all of those products (see deliverables).
- Chisago County will contribute effort, and possibly funding to this project.

Summary Budget Information for Result 2: Trust Fund Budget: \$200,214
Amount Spent: \$200,214
Balance: \$ 0

Deliverable	Completion Date	Budget	Status
1. County Well Index database	6/30/08	\$40,651.75	complete
2. Revised surficial geology map	6/30/08	\$25,651.75	complete
3. Bedrock topography / drift thickness	9/30/08	\$ 3,500.00	complete
4. Bedrock geology map	6/30/09	\$61,303.50	complete
5. Progress on subsurface geology	6/30/09	\$69,107.00	underway

Final Report Summary:

Approximately 75% of the products typically included in a county geologic atlas have been completed for Chisago County. This is a positive outcome considering a typical atlas costs about \$330,000 and this work has been completed for less than \$200,000. Completing the atlas with the funds allocated to that purpose in the 2008 grant will be a challenge, but I am hopeful we will achieve that.

V. TOTAL TRUST FUND PROJECT BUDGET:

Staff or Contract Services: MGS salaries and fringes \$329,182
(several permanent staff at less than full time, students)
MGS travel, vehicle rentals \$ 10,769

Contract drilling services \$ 52,509

Equipment: \$ 7,540

(includes supplies, repairs, and services, no equipment greater than several hundred dollars)

Development: \$ 0

Restoration: \$ 0

Acquisition, including easements: \$ 0

TOTAL TRUST FUND PROJECT BUDGET: \$ 400,000

Explanation of Capital Expenditures Greater Than \$3,500: none

VI. OTHER FUNDS & PARTNERS:

A. Project Partners: The MGS works with county staff create and deploy the atlases. Each county has contributed labor to this effort. When the geologic portions of these atlases are complete it is anticipated that DNR Division of Waters will undertake hydrologic studies to augment the geologic work. This proposal only funds the MGS portion of the work.

B. Other Funds Proposed to be Spent during the Project Period: The Minnesota Geological Survey State Special Appropriation does not fund the County Geologic Atlas Program.

DNR Waters currently funding the MGS at \$200,000 per year.

Selected counties contribute \$108,000 or less (based on tax capacity) or contributions of labor and in-kind spending will be accepted.

A matching contribution of \$41,110 from the USGS STATEMAP program was applied to the bedrock geologic mapping effort in Chisago County.

C. Past Spending: In the period 7/1/05 to 7/1/07 MGS will receive \$400,000 from DNR Waters, \$29,423 from Todd County, \$28,647 from Carlton County, and \$34,729 from McLeod County.

D. Time: \$400,000 over a 2 year period would bring the rate of funding back to levels achieved in 1995-2000 and roughly twice the current funding rate. This can be achieved efficiently and will allow MGS to begin mentoring some new staff in anticipation of the retirement of some experienced mapping staff. The two year time frame will not likely allow for a complete geologic atlas to be completed in any county. More likely, progress will be made in one or more counties and the work will be completed as funding allows.

VII. DISSEMINATION: The map files and associated databases are made available on the MGS web page <http://www.geo.umn.edu/mgs/> in multiple formats to accommodate the preferences of users. These files are also made available to affected

counties and they may also further distribute the results. The County Well Index database, including data from this project is available at <http://mdh-aqua.health.state.mn.us/cwi/cwiViewer.htm>.

VIII. REPORTING REQUIREMENTS:

Periodic work program progress reports will be submitted not later than Dec. 31, 2007, June 30, 2008, and December 31, 2008. A final work program report and associated products will be submitted between June 30 and August 1, 2009 as requested by the LCCMR

IX. RESEARCH PROJECTS:

Attachment A: Budget Detail for 2007 Projects - Summary and a Budget page for each partner (if applicable)											
Project Title: 5(j) County Geologic Atlas Program Acceleration											
Project Manager Name: Dale R. Setterholm											
Trust Fund Appropriation: \$ 400,000											
1) See list of non-eligible expenses, do not include any of these items in your budget sheet											
2) Remove any budget item lines not applicable											
2007 Trust Fund Budget	Result 1 Budget:	Amount Spent (06/30/2009)	Balance (date)	Result 2 Budget:	Amount Spent (06/30/2009)	Balance (date)	Result 3 Budget:	Amount Spent (date)	Balance (date)	TOTAL BUDGET	TOTAL BALANCE
	<i>Geologic Mapping and Databases, Benton County, FY 08 and 09</i>			<i>Geologic Mapping and Databases, Chisago County, FY 08 and 09</i>			<i>Fill in your result title here.</i>				
BUDGET ITEM			0			0			0	0	0
PERSONNEL: wages and benefits	150,187	156,269	-6,083	150,703	172,913	-22,209			0	300,890	-28,292
Contracts			0			0			0	0	0
Professional/technical (Drilling Services)	38,000	32,186	5,814	20,000	20,323	-323			0	58,000	5,492
Other Supplies (Lab Services and supplies, printing, general supplies and services, repairs and maintenance)	6,200	4,607	1,593	6,112	2,933	3,179			0	12,312	4,772
Travel expenses in Minnesota	5,399	6,724	-1,325	23,399	4,045	19,354			0	28,798	18,029
COLUMN TOTAL	\$199,786	\$199,786	\$0	\$200,214	\$200,214	\$0	\$0	\$0	\$0	\$400,000	\$0